

02-10-00

17



PATENT
Docket No. 1948-4666
Express Mail Label No. EJ604718822US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

UTILITY APPLICATION AND APPLICATION FEE TRANSMITTAL (1.53(b))

ASSISTANT COMMISSIONER FOR PATENTS
Box Patent Application
Washington, D.C. 20231



Sir:

Transmitted herewith for filing is the patent application of

Named Inventor(s) and
Address(es):

Pierre ALBOU, 16 rue Boussaingault, 75013 Paris, France

For:

MOTOR VEHICLE HEADLAMP OF THE ELLIPTICAL TYPE CAPABLE OF
EMITTING A CUT-OFF BEAM WITH IMPROVED PHOTOMETRY

Enclosed are:

[X] 15 page(s) of specification, 1 page(s) of Abstract, 2 page(s) of claims

[X] 5 sheets of drawing [X] formal [] informal

[X] 1 page(s) of Declaration and Power of Attorney

[] Unsigned

[X] Newly Executed

[] Copy from prior application

[] Deletion of inventors including Signed Statement under 37 C.F.R. § 1.63(d)(2)

[] Incorporation by Reference: The entire disclosure of the prior application, from which a copy of the combined declaration and power of attorney is supplied herein, is considered as being part of the disclosure of the accompanying application and is incorporated herein by reference.

[] Microfiche Computer Program (Appendix)

[] _____ page(s) of Sequence Listing

[] computer readable disk containing Sequence Listing

[] Statement under 37 C.F.R. § 1.821(f) that computer and paper copies of the Sequence Listing are the same

[X] Claim for Priority

[X] Certified copy of Priority Document(s)

09501069, 020900

- ☐ English translation documents
- ☒ Information Disclosure Statement
- ☒ Copy of 6 cited references
- ☐ Copy of PTO-1449 filed in parent application serial No. _____
- ☐ Preliminary Amendment
- ☒ Return receipt postcard (MPEP 503)
- ☒ Assignment Papers (assignment cover sheet and assignment documents)
- ☒ A check in the amount of \$40.00 for recording the Assignment.
- ☐ Assignment papers filed in parent application Serial No. _____
- ☐ Certification of chain of title pursuant to 37 C.F.R. § 3.73(b).
- ☐ This is a ☐ continuation ☐ divisional ☐ continuation-in-part (C-I-P) of prior application serial no. _____
- ☐ Cancel in this application original claims _____ of the parent application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
- ☐ A preliminary Amendment is enclosed. (Claims added by this Amendment have been properly numbered consecutively beginning with the number following the highest numbered original claim in the prior application.
- ☐ The status of the parent application is as follows:
- ☐ A Petition For Extension of Time and a Fee therefor has been or is being filed in the parent application to extend the term for action in the parent application until _____
- ☐ A copy of the Petition for Extension of Time in the co-pending parent application is attached.
- ☐ No Petition For Extension of Time and Fee therefor are necessary in the co-pending parent application.
- ☐ Please abandon the parent application at a time while the parent application is pending or at a time when the petition for extension of time in that application is granted and while this application is pending has been granted a filing date, so as to make this application co-pending.
- ☐ Transfer the drawing(s) from the patent application to this application.
- ☐ Amend the specification by inserting before the first line the sentence:
This is a ☐ continuation ☐ divisional ☐ continuation-in-part of co-pending application Serial No. _____
_____ filed _____

09501069 020900

I. CALCULATION OF APPLICATION FEE (For Other Than A Small Entity)

	Number Filed		Number Extra	Rate	Basic Fee \$690.00
Total Claims	11	-20=	0	x\$18.00	\$ 0
Independent Claims	1	- 3=	0	x\$78.00	\$ 0
Multiple Dependent Claims	<input type="checkbox"/> yes <input type="checkbox"/> no				Additional Fee = \$260.00 Add'l Fee = NONE \$ 0

Total: \$ 690.00

- ☐ A statement claiming small entity status is attached or has been filed in the above-identified parent application and its benefit under 37 C.F.R. § 1.28(a) is hereby claimed. Reduced fees under 37 C.F.R. § 1.9(F) (50% of total) paid herewith \$ _____.
- ☒ A check in the amount of \$ 690.00 in payment of the application filing fees is attached.
- ☐ Charge Fee(s) to Deposit Account No. 13-4500. Order No. _____. A DUPLICATE COPY OF THIS SHEET IS ATTACHED.
- ☒ The Assistant Commissioner is hereby authorized to charge any additional fees which may be required for filing this application, or credit any overpayment to Deposit Account No. 13-4500, Order No. 1948-4666. A DUPLICATE COPY OF THIS SHEET IS ATTACHED.

Respectfully submitted,

MORGAN & FINNEGAN, L.L.P.

Joseph A. Calvaruso
 By: Joseph A. Calvaruso
 Registration No. 28,287

Dated: February 9, 2000

CORRESPONDENCE ADDRESS:

MORGAN & FINNEGAN, L.L.P.
 345 Park Avenue
 New York, New York 10154
 (212) 758-4800
 (212) 751-6849 Facsimile

FORM: UTL-TRAN.NY
 Rev. 12/29/99

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : Pierre ALBOU Group Art Unit:

Serial No. : Examiner:

Filed :

For : MOTOR VEHICLE HEADLAMP F THE ELLIPTICAL TYPE CAPABLE
OF EMITTING A CUT-OFF BEAM WITH IMPROVED PHOTOMETRY



EXPRESS MAIL CERTIFICATE

Express Mail Label No. EJ604718822US

Date of Deposit February 9, 2000

I hereby certify that the following attached paper(s) and/or fee

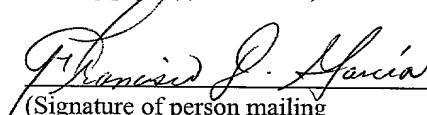
1. utility application and fee transmittal
2. recordation of assignment with assignment and fee
3. claim to convention priority with document
4. information disclosure statement w/references
5. data entry sheet
6. return postcard

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under
37 C.F.R. §1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Box
Patent Application, Washington, D.C. 20231.

FRANCISCO GARCIA

(Typed or printed name of person

mailing paper(s) and/or fee)


(Signature of person mailing
paper(s) and/or fee)

CORRESPONDENCE ADDRESS:
MORGAN & FINNEGAN, L.L.P.
345 Park Avenue
New York, New York 10154
(212) 758-4800
(212) 751-6849 Facsimile

FORM: EXP-MAIL.NY
Rev. 05/27/98

Correspondence Information

Name Line One :: Joseph A. Calvaruso, Esq.
Name Line Two :: Morgan & Finnegan, L.L.P.
Address Line One :: 345 Park Avenue
City :: New York
State/Province :: New York
Postal or Zip Code :: 10154-0053
Telephone :: 212-758-4800
Fax :: 212-751-6849

Application Information

Title Line One :: MOTOR VEHICLE HEADLAMP OF THE
Title Line Two :: ELLIPTICAL TYPE CAPABLE OF EMITTING
Title Line Three :: A CUT-OFF BEAM WITH IMPROVED PHOTOMETRY
Total Drawing Sheets :: 5
Formal Drawings :: Y
Application Type :: Utility
Docket Number :: 1948-4666

Representative Information

Registration Number One ::28,287

Prior Foreign Applications

Foreign Application One :: 99 01495
Filing Date :: 09 February 1999
Country :: France
Priority Claimed :: Y

PATENT

Docket No. 1948-4666

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES PATENT APPLICATION

For: MOTOR VEHICLE HEADLAMP OF THE ELLIPTICAL TYPE
CAPABLE OF EMITTING A CUT-OFF BEAM WITH IMPROVED
PHOTOMETRY

Inventor: Pierre ALBOU
French
16, rue Boussaingault
75013 Paris, France

**A MOTOR VEHICLE HEADLAMP OF THE ELLIPTICAL TYPE CAPABLE
OF EMITTING A CUT-OFF BEAM WITH IMPROVED PHOTOMETRY**

FIELD OF THE INVENTION

5

The present invention relates in a general way to headlamps of the elliptical type for motor vehicles.

BACKGROUND OF THE INVENTION

10

An elliptical headlamp conventionally comprises a light source such as an incandescent filament or the luminescent arc of a discharge lamp, this source being placed in a first focal region of a mirror so that the light reflected by it is directed towards a second focal region situated in front of the first one. A lens, generally plano-convex, is focused on this second focal region, so as to project the light spot formed in said second focal region onto the road.

20

This light spot can be modeled, for example with a mask, to form a beam with cut-off as required, such as a dipped beam, an upper edge of this mask defining the profile of this cut-off.

25

Because of this possibility of forming a sharp cut-off, and because of the excellent recovery by the mirror of the light flux emitted by the source, such headlamps have been used successfully for many years to form dipped European beams with cut-off in a "V" shape.

30

In contrast, to produce a dipped beam in accordance with the standards in force in the United States of America, relying on a headlamp of the elliptical type poses more difficulty.

This is because one of the specific features of these standards lies in the requirement for a maximum

09501069 020500

brightness in the axis of the road which is substantially twice as high as in the European standard, whereas the standardized lamps used in the USA (for example of the 9006 standardized type) have a
5 lower brightness (for identical overall flux and diameter) than the European lamps (for example of the standardized H7 or H9 type) since their filament is substantially lengthy.

Under these conditions, it can be understood
10 that a headlamp possessing a conventional mirror in the shape of an axisymmetric ellipsoid will, in the absence of a mask, generate a beam exhibiting, in the vicinity of the optical axis, a central part of relatively great thickness, due to the images of the filament, which are
15 elongated in the vertical direction and which are produced by the areas of the mirror which are situated immediately above and below the lamp, whereas regions of the mirror laterally very far from the lamp will generate lateral parts of the beam, corresponding to
20 small, horizontally elongated, images of the filament, which will exhibit a substantially reduced thickness by comparison with said central part.

It is conventionally sought, however, in order to produce a satisfactory dipped beam, to give the
25 beam, below the cut-off, a thickness which remains substantial over a significant extent in width, this being done particularly so as properly to illuminate the verges of the road.

It is also sought to obtain this result without
30 degrading the concentration spot of the beam, which is directed in the axis of the road or slightly to the right (in the case of traffic driving on the right).

005020 6907060

DISCUSSION OF THE INVENTION

An object of the present invention is to remedy these limitations of the state of the art, and to
5 generate, with the aid of a specifically designed mirror, a beam which, once partially shaded by a cut-off mask in a way which is known in itself, gives particularly satisfactory illumination.

Hence the present invention relates to a motor
10 vehicle headlamp, comprising a light source, a mirror possessing first and second focal regions, and a converging lens, the source being placed in the first focal region and the lens possessing a focus situated in the second focal region, the mirror and the lens
15 having axes which are essentially coincident defining an optical axis of the headlamp, and the headlamp further including a mask placed in the region of the focus of the lens, in order thus to project a beam an upper cut-off of which is defined by said mask, and the
20 mirror being able to concentrate the light, in the vertical direction, towards a vertical focusing baseline extending substantially horizontally and transversely to the optical axis and passing close to the focus of the lens, wherein the mirror possesses at
25 least one corrected vertical focusing area able to concentrate the light, in the vertical direction, towards vertical focusing locuses remote from said vertical focusing line in the axial direction, in order thus to increase the thickness of the light reflected
30 by said area.

Preferred, but not limiting, aspects of the headlamp according to the invention are as follows:

- two corrected focusing areas are provided, situated on either side of an axial vertical plane.

- said areas are extreme lateral areas of the mirror.

- the or each corrected vertical focusing area possesses a corrected vertical focusing line separate, 5 in the axial direction, from said vertical focusing baseline.

- the mirror further comprises at least one area for vertical offsetting of the light able to generate a radiation which, on average, is offset upwards or downwards with respect to the vertical focusing baseline.

- the headlamp comprises a vertical offsetting area situated in the central region of the mirror and able to offset the light upwards, and two vertical offsetting areas situated on either side of said central region and able to offset the light downwards.

- the or each vertical offsetting area is constructed from sections of axisymmetric ellipsoids a first focus of which is situated above or below the source and a second focus of which is situated on a vertical focusing line associated with said area.

- the first focus of each ellipsoidal section is situated substantially in the vertical to the center of the source.

25 - the vertical distances between the first
focuses of the various ellipsoidal sections and the
center of the source vary progressively from one
section to the other.

- from the back of the mirror to its lateral edges, said vertical distances pass progressively from a first value corresponding to a first focal position situated below the source to a second value, of opposite sign, corresponding to a first focal position situated above the source.

- in the region of the lateral edges of the mirror, said vertical distance is essentially zero.

Other aspects, objectives and advantages of the present invention will emerge better on reading the following detailed description of a preferred embodiment thereof, given by way of non-limiting example and with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

10

Figure 1 diagrammatically illustrates the profile of the light beam generated by a headlamp of the elliptical type equipped with an elongated source oriented axially,

15

Figure 2 graphically illustrates a law of change in the reflection by the mirror as a function of the angle, in projection in the axial horizontal plane, of the light ray emitted by the source,

20

Figure 3 illustrates the profile of a vertical focusing baseline specific to the mirror of the headlamp,

Figure 4 illustrates the profile of a light beam obtained with the mirror having the properties illustrated in Figures 2 and 3,

25

Figure 5 illustrates the profile of a focusing line used for certain areas of the mirror,

Figure 6 diagrammatically illustrates the contours of the light beam obtained by using the focusing illustrated in Figure 7,

30

Figure 7 is a view in projection in the vertical plane, illustrating the construction of a mirror according to the present invention,

Figure 8 diagrammatically illustrates the contours of the light beam obtained by using a mirror designed in accordance with Figure 7,

Figure 9 graphically illustrates an example of the change in a parameter used in the construction of the mirror represented in Figure 7, and

Figure 10 illustrates in a more detailed way the profile of the beam obtained with the parameter changing as illustrated in Figure 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Referring first of all Figure 1, a headlamp has been represented partially and diagrammatically, this headlamp comprising a light source 10, in this instance the filament of an incandescent lamp (or in a variant the arc of a discharge lamp), a mirror 20 and a plano-convex lens 30.

A right-angled reference system $(0, x, y, z)$ is defined here, the center 0 of which constitutes a reference focus F_0 of the mirror, in which the Ox direction is horizontal and perpendicular to the general direction of emission of the light, in which the Oy direction defines this general direction of emission or optical axis, and in which the Oz direction is vertical.

The mirror 20, with axis $y-y$, is of the ellipsoidal type, and possesses a usable reflecting surface 21 and upper and lower cheeks 22.

The usable surface possesses a first focal region (namely the reference focus F_0) in which the source 10 is situated, and a second focal region situated further forward than the focus F_1 on the $y-y$

axis, in which is concentrated the radiation output by the source 10 after reflection on the mirror. In the present example, this mirror is produced in accordance with the principles described in the document FR-A-2 704 044 in the name of the Applicant, to which reference will be made for all the details of its construction, such that the second focal region consists of a vertical focusing line F which, in this instance, extends symmetrically on either side of the optical axis y-y and with a curved shape the concavity of which is directed outwards. This vertical focusing line is the set of the convergence locuses, in vertical planes, of the rays emitted by vertical slices of the mirror and here is located substantially within the tangential focal surface of the lens 30.

In order particularly to limit the overall depth of the headlamp, it is advantageous to position the focusing line F situated close to the front edge 23 of the mirror 20, as illustrated.

As for the lens 30, it possesses an axial focus FL, as has been indicated, a tangential focal surface which passes substantially through the line F, its focus FL thus being situated substantially at the intersection of the focusing line F and of the optical axis y-y, so as to project onto the road the image of the light spot formed in this region.

In accordance with the teachings of FR-A-2 704 044, the mirror is designed in particular in such a way that all the light rays (RL) emitted towards the mirror from the reference point F0 and contained in a vertical plane forming an angle θ with respect to the axial vertical plane y0z are, after reflection, concentrated at a defined place (point FM) of the curve F, and the mirror can be designed in such a way as to obtain laws

of progression of the locus of the point FM as a function of the value of θ which are of absolutely any sort. This is obtained by arranging for the cross section of the mirror in the axial vertical plane of angle θ to be identical to the cross section, in the same plane, of an axisymmetric ellipsoid with focuses F0 and FM.

It will be understood here that, by varying these laws, it is possible to model the light spot in the region of the focus of the lens 30, and hence the photometry of the projected beam. In particular, it is possible, for a given angle θ and hence for a given average size of the images of the source, to choose a point FM situated either on the focus FL, or situated laterally, on one side or the other, spaced away from it.

In order to give the projected beam its range, it is necessary to generate a high intensity in the axis of the road. The lens 30, though, projects into the axis of the road only the rays which pass through its focus FL. Hence, in the mirror, areas are defined which are capable of reflecting the rays in such a way that, on the one hand, they pass through the focus FL, that is to say through the intersection of the curve F and of the y-y axis, and that, on the other hand, they encounter the entry face of the lens 30, and other areas for which the reflected rays which would pass through the focus FL would not encounter the entry face of the lens, and would therefore be lost. These other areas are therefore designed in such a way as to cause the light to converge on locuses of the curve F such that these rays encounter the entry face of the lens 30.

In Figure 1, for the right-hand half of the mirror, areas G0 and G1 have been plotted, these areas belonging to the first category, and the area G2 which belongs to the second category. Corresponding areas exist in the left-hand half of the mirror, this being produced symmetrically with respect to the plane yOz . In Figure 1 are also plotted examples of rays R1 and R2 which are reflected by the inner and outer edge areas, respectively, of this area G2. The ray R1 passes again through the focus FL (this makes it possible to ensure continuity of the join between the areas G1 and G2) and encounters the lens in the vicinity of its opposite edge, while the ray R2 encounters the lens in this same region, crossing the curve F a long way from the point FL.

If this area G2 is examined, it will be understood that it produces images of the source which are at the same time small and slightly inclined with respect to the horizontal; it will also be understood that the lens projects these images at infinity with more or less significant horizontal deviations.

As for the area G0, it is located at the back of the mirror. It will be understood that it produces images of the source which are essentially vertical and of large size.

If the rays corresponding to these images are sent back to the focus FL, then the beam projected will, because of the accumulation of such images in the axis of the road, exhibit a very great thickness, called "flame" of light, which will strongly illuminate the road very close to the vehicle, which is unacceptable for visual comfort since vision in the far distance is then greatly degraded.

Hence, according to a preferred characteristic of the mirror according to the invention, the area G0 is designed so that at least a substantial part of the radiation which it reflects passes some distance away from the focus FL as it is propagated. In that way, a part of the large vertical images is displaced laterally, away from the main illumination field of the headlamp, so as not to disturb vision in the far distance.

The respective widths of the areas G0 and G1 are chosen as a compromise between a substantial width for the area G0 which contributes to spacing away the large vertical images or images slightly inclined with respect to the vertical, and a substantial width for the areas G1, which contributes to giving the beam its range in the axis.

Figure 2 is a curve illustrating an example of the light distribution achieved in accordance with the invention. This curve gives the setting x_F of the intersection of the light reflected with the curve F, as a function of the angle θ of the ray emitted from the reference point 0 with respect to the reference direction 0y directed towards the back of the mirror ($\theta = 0$).

Figure 3 illustrates the profile of this curve F, in the form $y_F = f(x_F)$.

It is seen in Figure 2 that, as regards the area G0, the setting x_F varies progressively from -20 mm to about -2 mm, for θ varying from 0° to 30° , this angle of 30° here being the site of the boundary between the areas G0 and G1.

In this way, the images emitted by the back of the filament will be found to be very much displaced laterally with respect to the optical axis, and

progressively less and less displaced in proportion as the angle θ increases.

In the area G1, which is covered by θ angles varying between 30° and about 94° , the setting x_F varies progressively from -2 mm to 0 mm, which means that the whole of the radiation reflected by this area passes onto or very close to the focus FL of the lens, so as consequently to be projected in the axis of the road or very slightly inclined with respect to this axis.

Finally the area G2, which here covers the angles lying between 94° and 130° , reflects the radiation over x_F settings varying progressively from 0 to 15 mm, this progression, in conjunction with the abovementioned angular range, being determined so that all the rays reflected actually encounter the entry face of the lens 30.

The profile of the beam projected onto the road by the lens 30 with such a mirror is illustrated in Figure 4 by a set of isocandela curves. A good point of concentration is observed in the axis, but a beam thickness which, on the one hand, is excessive as regards the axis of the road, and, which, in contrast, is insufficient towards the sides.

Hence such a beam cannot serve as a correct basis for producing, in a way which is perfectly familiar, with the aid of a mask placed in the vicinity of the focal plane PF, a beam with cut-off such as a dipped beam. A description will now be given of the approach which makes it possible to obtain a beam the thickness of which below the cut-off can be well controlled, while varying within acceptable limits between the center and the left and right edges of the beam.

According to a first aspect of this approach, the mirror is designed so that certain areas of the mirror carry out vertical focusing of the light not on the line F, but at a distance from it.

5 Hence, Figure 6 illustrates, in addition to the baseline F, a line F' which touches the curve F in the region of the focus FL but which then moves away from it rapidly, exhibiting inverse curves on either side of the optical axis.

10 This line F' is preferably used for the construction of the areas G2 of the mirror, whereas the areas G0 and G1 are still constructed on the basis of the line F.

15 In that way, the radiation reflected by the areas G2 will be characterized by a vertical convergence which will be located at a greater or lesser distance from the tangential focal surface of the lens (depending on the shape of the line F'), and it will be understood that this causes an increase in
20 the thickness of the beam in the regions thereof to which these G2 areas primarily contribute (namely its areas which are laterally farthest away, in the example given in Figures 1 to 4).

25 The new profile of the beam is given diagrammatically in Figure 6, and it is noted that there is a gain in thickness in these lateral areas.

30 However Figure 6 also shows that, in the lower region of the beam, hollows persist in the region of which the light does not come low enough down to form an entirely satisfactory cut-off beam. It will be noted that these hollows correspond principally to the regions of the G1 areas which, on the one hand, generate relatively small images of the source and which, on the other hand, concentrate the light

00501050" 6907050

vertically at points of the line F which are at an average spacing from its center FL.

Hence, according to another aspect of the approach according to the invention, the design of the mirror is modified in order to attenuate or even eliminate these hollows.

This is achieved here by constructing the corresponding regions of the mirror no longer on the basis of the first reference focus F0 and of a second focus FM situated on the line F, but on the basis of a first reference focus Fd which has been offset vertically with respect to F0, and of the same point FM.

This principle of construction is illustrated in Figure 7, in the case in which the focus Fd is located below F0 ($z_{Fd} < 0$). It will be understood that, for any part of the mirror situated behind the transverse vertical plane x0z (that is to say for much the largest part of the solid angle of the light as intercepted by the mirror), any notional ray originating from the reference focus Fd will be reflected towards the line F. In contrast, the rays emitted by the source 10 will be reflected so as to propagate above the line F. Hence, after projection by the lens, these rays will be found to be pushed below the horizon.

The general profile of the beam thus modified is illustrated in solid lines in Figure 8. It will be observed here that, by virtue of appropriate parameter setting for the value of z_{Fd} , as a function of θ , it is possible to make fine adjustments to the general contour of the beam in its lower region.

In this regard, it will be noted first of all that, by increasing the value of z_{Fd} , the lowering of the light in the beam projected by the lens is

00501039.020500

accentuated. It will also be noted that, by choosing positive values of z_{Fd} , it is possible, on the contrary, to raise the light up, and particularly to raise up the large vertical images of the source, which are
5 generated principally by the regions of the mirror situated just above and just below the source, which contribute to forming the downwards bulge of light, in line with the optical axis, in the projected beam.

Hence Figure 8 also shows, in dotted line, a
10 possible variant of the contour of the projected beam in its lower part.

In a preferred way, in order to preserve the continuity of the mirror, it is particularly advantageous to make z_{Fd} change in a continuous way as a
15 function of the angle θ . Figure 9 illustrates an example of such a change, expressed in the form of the offset z_{Fd} relative to the radius r of the source 10 (in %) as a function of the relative change in the angle θ with respect to its maximum value θ_{max} (also in %). It is
20 observed that, starting from the back of the mirror, z_{Fd} is initially negative, so as to raise up the vertically elongated large images generated by the back region (whether or not these images are initially centered on the point FL). Next, z_{Fd} increases greatly then is
25 maintained at a constant value over a plateau, which has the effect of causing a lowering of numerous small and medium-sized images of the source. Finally, for the parts of the mirror which are laterally farthest from the back of the mirror, z_{Fd} again decreases
30 progressively down to a zero value for $\theta = \theta_{max}$.

It will be observed here that the controls on x_F and of z_{Fd} as a function of θ can be governed totally independently of one another.

006020"68070550

The profile of the beam obtained with the parameter setting of z_{Fd} as illustrated in Figure 9 is represented in Figure 10.

5 The effect of a traditional mask intended to form a cut-off beam, such as an anti-fog or dipped beam, is also illustrated in this figure (such a mask, for its part, being illustrated in dashed line and designated by the reference 40 in Figure 7), and it is observed that the beam possesses a good point of
10 concentration in the axis of the road, a reasonable thickness in line with this axis, which makes it possible advantageously not to illuminate the road too close to the vehicle, and a greater thickness towards the lateral edges of the beam, which makes it possible
15 to illuminate the verges correctly.

Naturally, and in a way which is perfectly well known, the shape of the edge of the mask determines the profile of the cut-off, in order, for example, to produce an anti-fog beam (flat cut-off), a European
20 dipped beam with a symmetric cut-off in a "V" shape, an American dipped beam with cut-off defined by two straight half-lines offset in height, etc.

The invention applies more particularly to this last type of beam, having regard to the difficulties
25 posed by the characteristics of the source, as mentioned in the introduction. In this regard, with the American regulations not requiring a particularly sharp cut-off, a fuzzy cut-off can be formed by offsetting the mask along the axial direction y-y with respect to
30 the point FL.

WHAT IS CLAIMED IS

1. A motor vehicle headlamp, comprising a light source, a mirror possessing first and second focal regions, and a converging lens, the source being placed in the first focal region and the lens having a focus located in the second focal region, the mirror and the lens having axes which are essentially coincident defining an optical axis of the headlamp, and the headlamp further including a mask located in the region of the focus of the lens, in order thus to project a beam an upper cut-off of which is defined by said mask, and the mirror being adapted to concentrate the light, in the vertical direction, towards a vertical focusing baseline extending substantially horizontally and transversely to the optical axis and passing close to the focus of the lens, wherein the mirror comprises at least one corrected vertical focusing area adapted to concentrate the light, in the vertical direction, towards vertical focusing locuses remote from said vertical focusing line in the axial direction, in order thus to increase the thickness of the light reflected by said area.
2. A headlamp as claimed in claim 1, wherein two corrected focusing areas are provided, situated on either side of an axial vertical plane.
3. A headlamp as claimed in claim 2, wherein said areas are extreme lateral areas of the mirror.
4. A headlamp as claimed in claim 1, wherein the corrected vertical focusing area possesses a corrected vertical focusing line separate, in the axial direction, from said vertical focusing baseline.
5. A headlamp as claimed in claim 1, wherein the mirror further comprises at least one area for vertical

offsetting of the light able to generate a radiation which, on average, is offset upwards or downwards with respect to the vertical focusing baseline.

6. A headlamp as claimed in claim 5, comprising a vertical offsetting area located in the central region of the mirror and adapted to offset the light upwards, and two vertical offsetting areas located on either side of said central region and adapted to offset the light downwards.

7. A headlamp as claimed in claim 5, wherein the vertical offsetting area is constructed from sections of axisymmetric ellipsoids a first focus of which is situated above or below the source and a second focus of which is situated on a vertical focusing line associated with said area.

8. A headlamp as claimed in claim 7, wherein the first focus of each ellipsoidal section is situated substantially in the vertical to the center of the source.

9. A headlamp as claimed in claim 8, wherein the vertical distances between the first focuses of the various ellipsoidal sections and the center of the source vary progressively from one section to the other.

10. A headlamp as claimed in claim 9, wherein, from the back of the mirror to its lateral edges, said vertical distances pass progressively from a first value corresponding to a first focal position situated below the source to a second value, of opposite sign, corresponding to a first focal position situated above the source.

11. A headlamp as claimed in claim 10, wherein, in the region of the lateral edges of the mirror, said vertical distance is essentially zero.

005020" 59070550

A motor vehicle headlamp comprises a source, a mirror possessing first and second focal regions, and a converging lens. The source is located in the first focal region and the lens possesses a focus situated in the second focal region. The mirror and the lens have axes which are essentially coincident defining an optical axis of the headlamp, and the headlamp further includes a mask located in the region of the focus of the lens, in order to project a beam an upper cut-off of which is defined by said mask. Finally, the mirror concentrates the light, in the vertical direction, towards a vertical focusing baseline extending substantially horizontally and transversely to the optical axis and passing close to the focus of the lens. The mirror has at least one corrected vertical focusing area able to concentrate the light, in the vertical direction, towards vertical focusing locuses remote from said vertical focusing line in the axial direction, in order thus to increase the thickness of the light reflected by said area.

006020" 69070560

FIG. 1

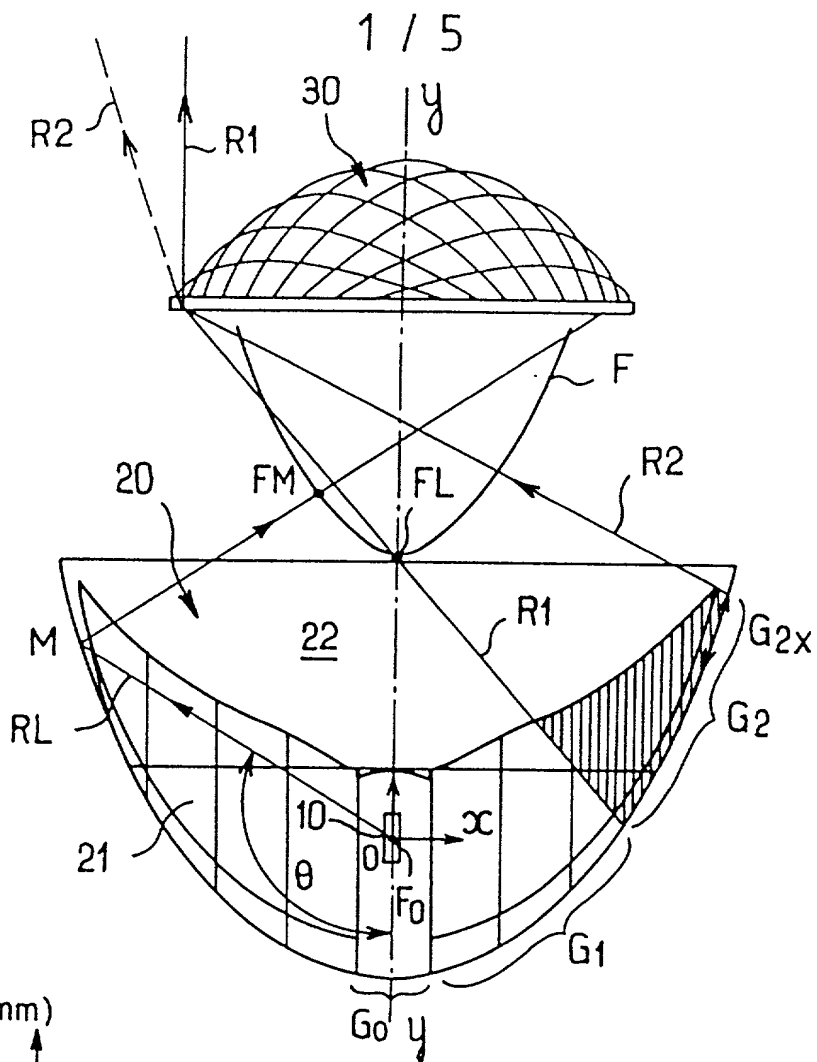


FIG. 2

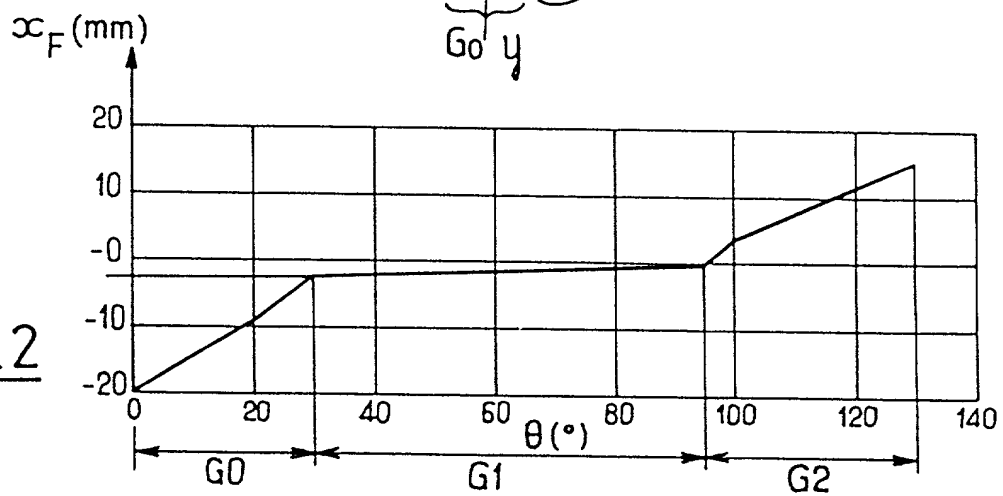
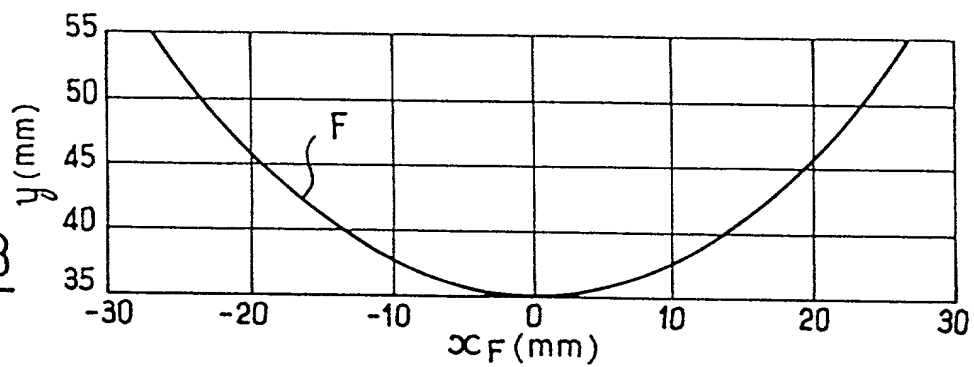
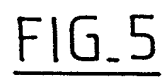
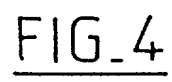
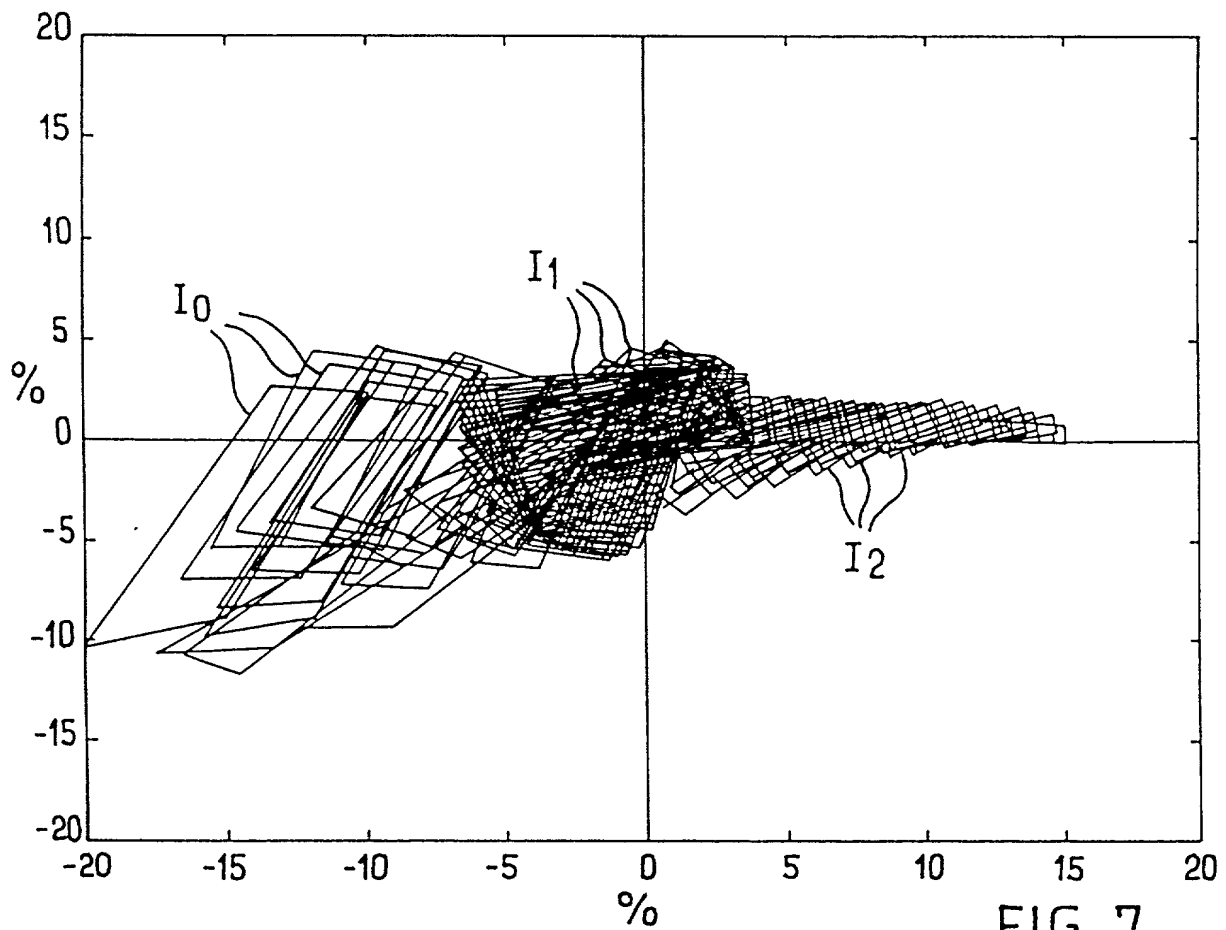
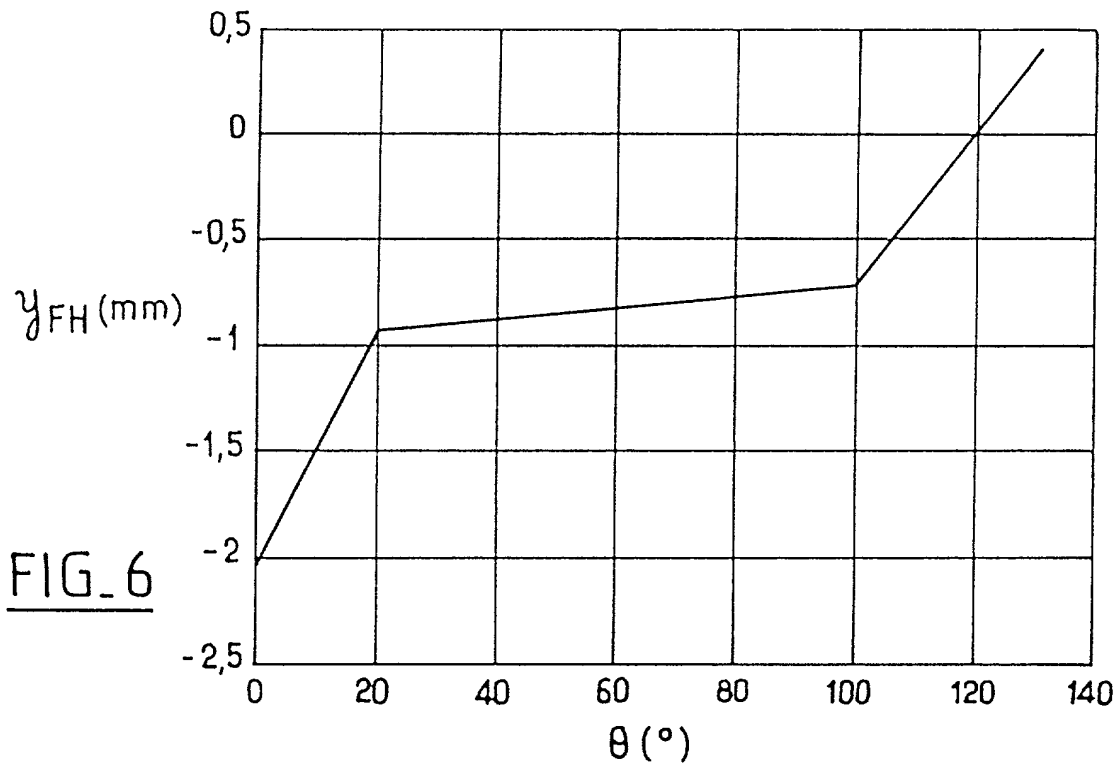
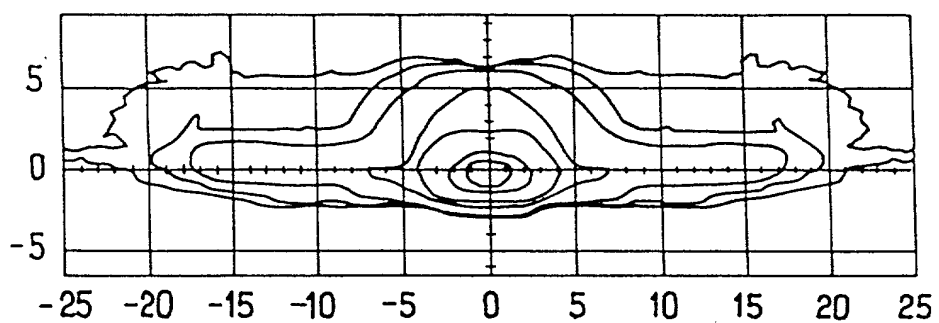
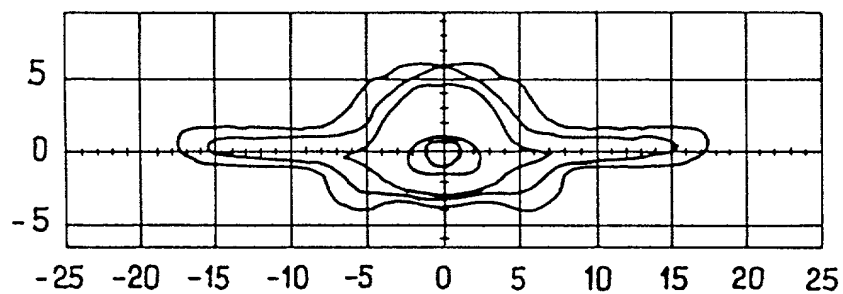
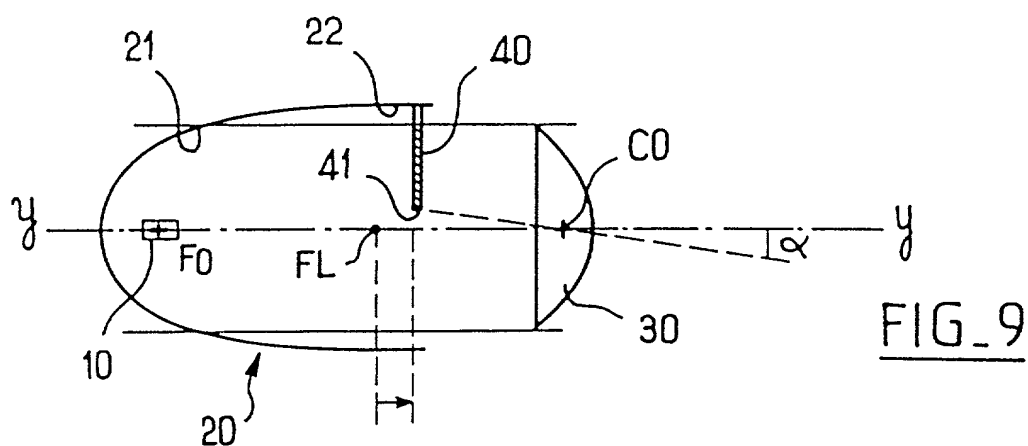
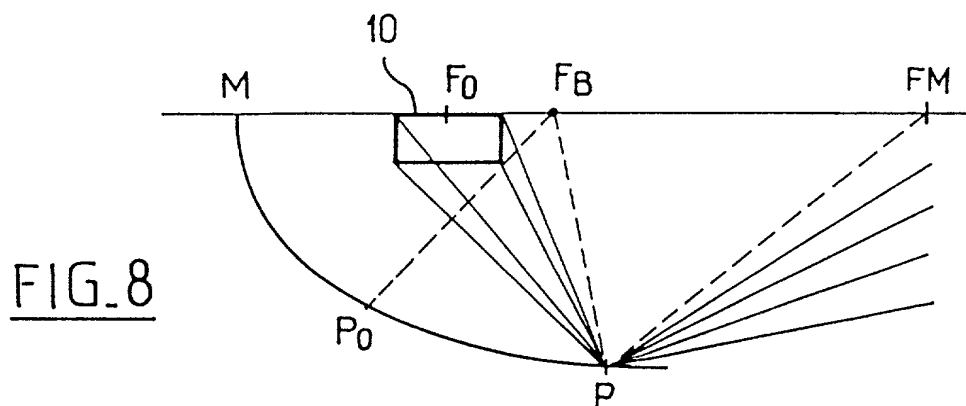


FIG. 3









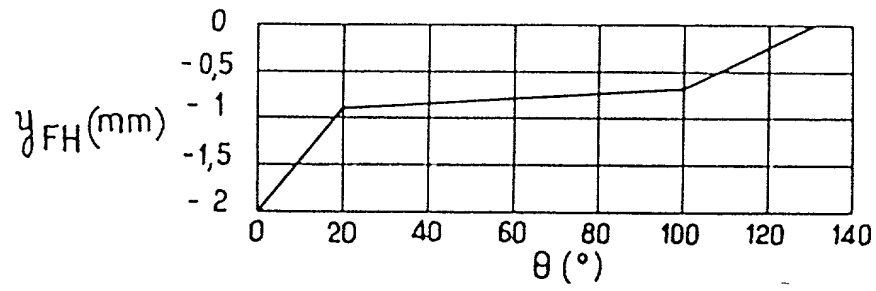


FIG. 12

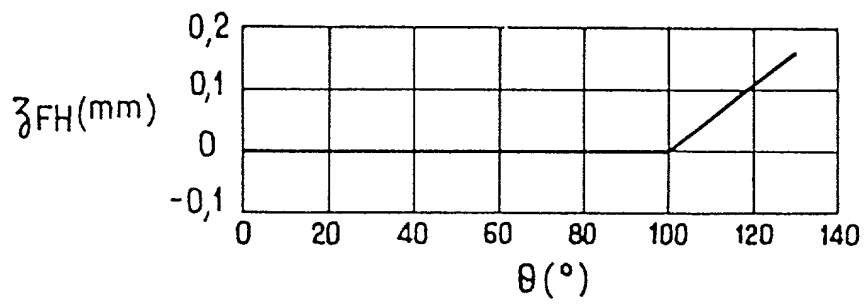


FIG. 13

FIG. 14

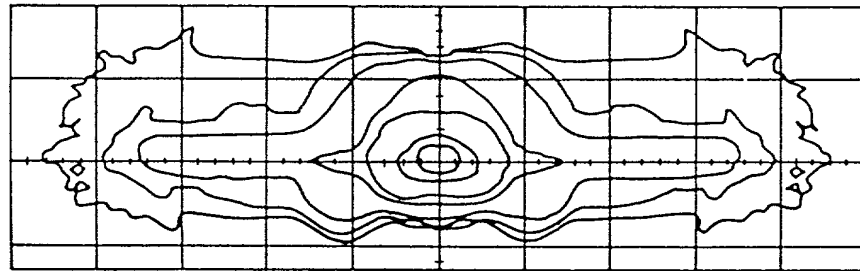
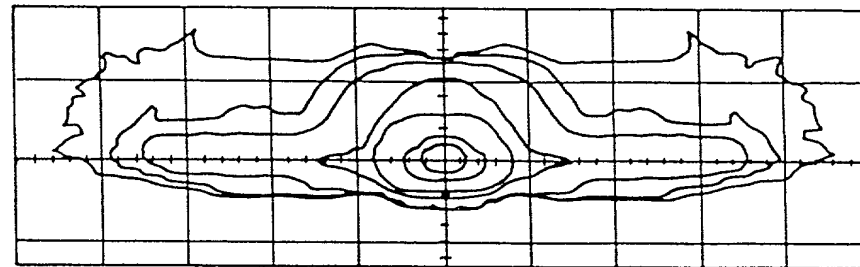


FIG. 15



006020" 69070550

C 1171

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

MOTOR VEHICLE HEADLAMP OF THE ELLIPTICAL TYPE CAPABLE OF EMITTING A CUT-OFF BEAM

the specification of which **WITH IMPROVED PHOTOMETRY**

(check one) ☒ is attached hereto.

☐ was filed on

as U.S. Application Serial Number
and was amended on

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above, to the best of my ability. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. 1.56 as set forth on the reverse side hereof. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date (1) before that of the application on which priority is claimed or (2) if no priority claimed, before the filing date of this application :

PRIOR FOREIGN APPLICATION(S)

Number	Country	Month /Day /Year Filed	Priority Claimed	
			yes	no
99 01495	France	02/09/1999	xx	

I hereby claim the benefit under 35 U.S.C. 120/365 of all United States and PCT international applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior applications in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior applications and the national or PCT international filing date of this application :

PRIOR U.S. OR PCT APPLICATION(S)

Application serial N°	month/day/Year filed	Status		
		patented	pending	abandoned

And I hereby appoint the following attorney (s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith :

Jerome G. Lee (Reg. N°16,967)

Joseph A. Calvaruso (Reg. N° 28,287)

SEND CORRESPONDENCE TO :

MORGAN & FINNEGAN
345 Park Avenue, NEW YORK, N.Y. 10154

DIRECT TELEPHONE CALLS TO :

(212) 758-4800

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true ; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardise the validity of the application or any patent issued thereon.

1) Inventor's signature  Date (month/day/year) 01/20/2000

Inventor's Name (typed)	Pierre	ALBOU	Citizenship	French
	<i>First</i>	<i>Middle initial</i>	<i>Family Name</i>	
Residence (City)	75013 PARIS	State/Foreign/country	FRANCE	
Post Office Address (Include zip code)	16, rue Boussaingault			

2) Inventor's signature Date (month/day/year)

Inventor's Name (typed)		Citizenship	French
	<i>First</i>	<i>Middle initial</i>	<i>Family Name</i>
Residence (City)		State/Foreign/country	France
Post Office Address (Include zip code)			

3) Inventor's signature Date (month/day/year)

Inventor's Name (typed)		Citizenship	
	<i>First</i>	<i>Middle initial</i>	<i>Family Name</i>
Residence (City)		State/Foreign/country	
Post Office Address (Include zip code)			